

Remarks

1 This communication is considered fully responsive to the Office action
2 mailed January 2, 2004. Claims 1-22 were examined and stand rejected. Claims 12
3 and 15 are canceled. Claims 1, 2, 9, and 13 are amended. Claims 23-29 are added.
4 Reexamination and reconsideration of claims 1-29 are respectfully requested.

Information Disclosure Statement

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6 A copy of the reference cited at 1Q on the Information Disclosure
7 Statement is provided herewith, along with another copy of the originally
8 submitted Form PTO 1449 for the Examiner's convenience. Consideration of the
9 reference is respectfully requested. No additional fees are believed to be due
10 because the reference was originally cited by the Applicant. In the event that
11 additional fees may be required, these fees are hereby authorized to be charged to
12 Applicant's PTO deposit account number provided on the Transmittal.

Drawings

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14 The Drawings were objected to because Figs. 5 and 6 include a
15 typographical error. Corrections are shown in red-line format on the attached
16 Annotated Drawing Sheet. Replacement Drawing Sheet 3 is also attached. There
17 are no substantive changes and no new matter is added. Applicant respectfully
18 requests the corrected drawings be entered.

Specification

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20 The specification at page 9, lines 17-20 is amended to be consistent with
21 the description of "dividers" used throughout the specification and shown in the
22 drawings. No new matter is added by this amendment.
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Claim Objections

Claim 13 was objected to because the claim contained the acronym "ECC" in parenthesis. Claim 13 is amended to replace "ECC" with "error correcting code."

New Claims

Claims 23-29 are added. Each of the new claims includes numerous recitations not present in the cited references.

Claim Rejections - 35 U.S.C. §101

Claim 1 was rejected under 35 U.S.C. §101 as being purportedly directed to non-statutory subject matter. Claim 1 is amended. The data structure recited in amended claim 1 includes specific structural elements in a computer-readable medium that cause a functional change in a computer system. Therefore amended claim 1 is more than a mere abstraction and is directed to statutory subject matter. *See In re Lowry*, 32 U.S.P.Q.2d 1031 (Fed. Cir. 1994). Applicant respectfully requests withdrawal of the rejection of claim 1.

Claims 4 and 21 were rejected under 35 U.S.C. §101 as being purportedly directed to non-statutory subject matter. Specifically, the Office Action characterized the "divider" as being an abstract idea. Applicant respectfully traverses this rejection. The specification and drawings clearly describe the dividers as being more than an abstract idea. For example, the specification clearly describes the dividers as logical segregations which may be implemented to segment a codeword. See, e.g., page 7, lines 7-14; page 8, line 25 to page 9, line 4; and dividers 106, 108 and 110 shown in Fig. 1; and dividers 206, 208, 210 shown in Fig. 2. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 4 and 21.

Claim Rejections - 35 U.S.C. §103(a) - Agarwal

Claims 1-5, 7, 9, 11, 13-14, 18 and 21-22 were rejected under 35 U.S.C. §103(a) as being purportedly unpatentable over U.S. Patent No. 6,477,669 to Agarwal et al. ("Agarwal"). Applicant respectfully traverses this rejection.

Applicant's claim 1 positively recites "a divider between the payload and the redundancy, the divider being movable from a first location . . . to a second location." Agarwal does not teach or suggest at least these recitations.

The Office Action ignores the recitation of a divider in Applicant's claim 1. Specifically, the Office Action states that "[w]hen reading the claim without the divider" See page 4, lines 6-10 of the Office Action. However, each claimed recitation must be considered when judging the patentability of the claim against the prior art. MPEP at §2143.03; In re Boe, 184 USPQ 38, 40 (CCPA 1974). Accordingly, the Office Action has failed to make a prima facie case of obviousness.

For at least the foregoing reasons, claim 1 is believed to be allowable over the cited references and allowance of claim 1 is respectfully requested.

Claim 2 depends from claim 1, which is believed to be allowable. Therefore, claim 2 is also believed to be allowable for at least the same reasons as claim 1 and withdrawal of the rejection of claim 2 is respectfully requested.

Claim 3 positively recites "associating an initial error correcting code with a redundancy defined within a data storage device". Agarwal does not teach or suggest at least these recitations. Instead, the Office Action relied on Agarwal's disclosure of setting the error correction code to its maximum value and then summarily dismissed Applicant's claim by stating that "data storage and data communication use similar techniques to ensure the error-free communication (read/writes) of codewords." The Office Action therefore failed to make a prima facie case of obviousness as required by MPEP at §2143.

In addition, the Office Action failed to recognize that the maximum value in Agarwal is a worst case scenario that may be experienced by a communication

1 link (e.g., during inclement weather). See, e.g., Col. 7, lines 37-50. The error
2 correcting code may then be varied to match the actual quality of the
3 communication link (e.g., for a clear day). *Id.* Accordingly, there is no motivation
4 to define a redundancy within any particular hardware device (much less within a
5 data storage device), because the error correcting code can always be adjusted for
the actual quality of the communication link regardless of the hardware device.

6 For at least the foregoing reasons, claim 3 is believed to be allowable over
7 the cited references and allowance of claim 3 is respectfully requested.

8 Claims 4-5 and 7 depend from claim 3, which is believed to be allowable.
9 Therefore, claims 4-5 and 7 are also believed to be allowable for at least the same
10 reasons as claim 3. Withdrawal of the rejection of claims 4-5 and 7 is respectfully
requested.

11 With further regard to claim 4, the Office Action improperly ignored the
12 recitation of "moving a divider defined between the redundancy and a payload . .
13 ." and therefore has failed to make a prima facie case of obviousness. MPEP at
§2143.03.

14 With further regard to claim 5, "reorganizing an address space . . ." is not
15 taught or suggested by the cited references. The Office Action admits as much and
16 merely states that it would have been obvious to reorganize an address space.
17 However, the Examiner's statement is insufficient evidence to support a prima
18 facie case of obviousness. MPEP at §2143. If this rejection is maintained on a
19 similar basis in a subsequent action, Applicant respectfully requests the Examiner
20 provide affidavit evidence in support of any personal knowledge supporting this
conclusion, as required by 37 CFR §1.104(d)(2).

21 Claim 9 is amended to positively recite "tracking time and usage of the data
22 storage device to determine if the ratio results in sufficient redundancy." Agarwa
23 fails to teach or suggest these recitations. Indeed, the Office Action relied on page
24 1, line 27 to page 2, line 5 of Applicant's Background section in the specification
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1 to reject a similar recitation in original claim 12. However, the Background merely
2 states:

3 *The fundamental error rate is dependent on a number of factors. For*
4 *example, the technology type, media age, number of writes/reads*
5 *and other factors can impact the fundamental error rate.*
6 *Additionally, a composite memory device, such as a flash card*
7 *formed from several integrated circuits, can have a complex error*
8 *rate that reflects the distinct individual rates of each integrated*
9 *circuit. Page 1, line 27 to page 2, line 5.*

10 Although the Background discusses factors which may impact the
11 fundamental error rate, there is no teaching or suggestion of tracking time and
12 usage of the data storage device to determine if the ratio results in sufficient
13 redundancy. Therefore, claim 9 is believed to be allowable. Withdrawal of the
14 rejection of claim 9 is respectfully requested.

15 Claim 11 depends from claim 9, which is believed to be allowable.
16 Therefore, claim 11 is also believed to be allowable for at least the same reasons
17 as claim 9. Withdrawal of the rejection of claim 11 is respectfully requested.

18 Claim 13 is amended to positively recite "a technology type determination
19 module to report a technology of a storage device so that an initial error correcting
20 code will be more appropriately selected." Agarwal fails to teach or suggest at
21 least these recitations. To the contrary, Agarwal discloses:

22 *"During the time that an interface has not achieved synchronization,*
23 *it sets the forward error correction code value of its receiver and its*
24 *transmitter to a maximum value which assumes a worst case*
25 *scenario" Col. 8, lines 28-31 (emphasis added).*

1 There is no teaching or suggestion in Agarwal of a technology type determination
2 module so that an initial error correcting code will be more appropriately selected.
3 Indeed, the Office Action relied on page 1, lines 24-27 of Applicant's Background
4 section in the specification to reject a similar recitation in original claim 15.
5 However, the Background merely states:

6 *"The quantity of resources devoted to redundancy is commonly*
7 *based on the fundamental error rate of the data storage media. The*
8 *fundamental error rate of a data storage media is the rate at which*
9 *errors are found within the media." Page 1, lines 24-27.*

10 Clearly there is no teaching or suggestion in the Background of a technology type
11 determination module so that an initial error correcting code will be more
12 appropriately selected.

13 For at least the foregoing reasons, amended claim 13 is believed to be
14 allowable over the cited references. Withdrawal of the rejection of claim 13 is
15 respectfully requested.

16 Claims 14 and 18 depend from claim 13, which is believed to be allowable.
17 Therefore, claims 14 and 18 are also believed to be allowable for at least the same
18 reasons as claim 13. Withdrawal of the rejection of claims 14 and 18 is
19 respectfully requested.

20 Claim 21 positively recites "moving a divider" The Office Action
21 ignored this recitation. See page 21, lines 7-9 of the Office Action. However, each
22 claimed recitation must be considered when judging the patentability of the claim
23 against the prior art. MPEP at §2143.03; In re Boe, 184 USPQ 38, 40 (CCPA
24 1974). Accordingly, the Office Action has failed to make a prima facie case of
25 obviousness.

26 In addition, claim 21 positively recites "associating an initial error
27 correcting code with the redundancy defined within a data storage device" and

1 “associating an updated error correcting code with the redundancy in response to a
2 change in an error rate associated with the data storage device.” Agarwal fails to
3 teach or suggest at least these recitations.

4 The Office Action relied on Agarwal’s disclosure of setting the error
5 correction code to its maximum value until synchronization is achieved. However,
6 the maximum value in Agarwal is a worst case scenario that may be experienced
7 by a communication link (e.g., during inclement weather). See, e.g., Col. 7, lines
8 37-50. The error correcting code may then be varied to match the actual quality of
9 the communication link (e.g., for a clear day). *Id.* There is no motivation to define
10 a redundancy within any hardware device (much less a data storage device)
11 because the initial value is always based on a worst-case scenario for the
12 communication link. Nor is there any motivation to update the error code based on
13 changes in the error rate of any hardware device (much less a data storage device)
14 because the error correcting code can always be adjusted for the actual quality of
15 the communication link.

16 For at least the foregoing reasons, claim 21 is believed to be allowable over
17 the cited references and allowance of claim 21 is respectfully requested.

18 Claim 22 positively recites “monitoring an error rate of a storage device”.
19 On the other hand, Agarwal discloses an adaptive coding scheme which takes
20 advantage of the varying quality of a communication link by varying the forward
21 error correction code to match the actual quality of the communication link. See,
22 e.g., Col. 7, lines 38-43. There is no teaching or suggestion that the coding scheme
23 monitor the error rate of a hardware device (much less the error rate of a storage
24 device).

25 For at least the foregoing reasons, claim 22 is believed to be allowable over
the cited references and allowance of claim 22 is respectfully requested.

Claim Rejections - 35 U.S.C. §103(a) – Agarwal and Applicant's Specification

1 Claims 6, 8, 10, 12, 15-17, and 19-20 were rejected under 35 U.S.C.
2 §103(a) as being purportedly unpatentable over U.S. Patent No. 6,477,669 to
3 Agarwal et al. ("Agarwal") in view of the Applicant's specification. Applicant
4 respectfully traverses this rejection.

5 Claims 6 and 8 depend from claim 3, which is believed to be allowable as
6 discussed above. Therefore, claims 6 and 8 are also believed to be allowable for at
7 least the same reasons as claim 3. Withdrawal of the rejection of claims 6 and 8 is
8 respectfully requested.

9 Claim 10 depends from claim 9 which is believed to be allowable as
10 discussed above. Therefore, claims 10 is also believed to be allowable for at least
11 the same reasons as claim 9. Withdrawal of the rejection of claim 10 is
12 respectfully requested.

13 Claims 12 and 15 are canceled and therefore the rejection of these claims is
14 moot.

15 Claims 16-17 and 19 depend from claim 13 which is believed to be
16 allowable as discussed above. Therefore, claims 16-17 and 19 are also believed to
17 be allowable for at least the same reasons as claim 13. Withdrawal of the rejection
18 of claims 16-17 and 19 is respectfully requested.

19 With further regard to claims 6, 10, and 16, additional recitations are not
20 taught or suggested by the cited references. Claim 6 positively recites "performing
21 a memory test on the data storage device to determine if the initial error correction
22 code is of sufficient strength." Claims 10 and 16 include similar recitations.
23 Agarwa fails to teach or suggest these recitations. Instead, the Office Action relies
24 on the fundamental error rate discussed in Applicant's Background section of the
25 specification. However, there is no teaching or suggestion in the Background of
performing a memory test on a data storage device to determine if the initial error
correction code is of sufficient strength. For at least these additional reasons,

1 claims 6, 10, and 16 are each believed to be allowable over the cited references.
2 Allowance of claims 6, 10, and 16 is respectfully requested.

3 With further regard to claims 8 and 19, additional recitations are not taught
4 or suggested by the cited references. Claim 8 positively recites "tracking time and
5 usage of the data storage device to determine if the initial error correction code is
6 of sufficient strength." Claim 19 includes similar recitations. Agarwa fails to teach
7 or suggest these recitations. Instead, the Office Action relies on the fundamental
8 error rate discussed in Applicant's Background section of the specification.
9 However, there is no teaching or suggestion in the Background of tracking time
10 and usage of the data storage device to determine if the initial error correction
11 code is of sufficient strength. For at least these additional reasons, claims 8 and 19
12 are believed to be allowable over the cited references. Allowance of claims 8 and
13 19 is respectfully requested.

14 With further regard to claim 17, Agarwal fails to teach or suggest "an
15 application determination module to determine an application to which a storage
16 device will be put and to report to the update error correcting code assignment
17 module." The Office Action states that Applicant's Background section of the
18 specification at page 1, lines 24-26 explains that "the fundamental error rate is
19 used to help determine the amount of redundancy to use." However, there is no
20 such discussion in the Background. The Background merely states:

21 *"The quantity of resources devoted to redundancy is commonly*
22 *based on the fundamental error rate of the data storage media. The*
23 *fundamental error rate of a data storage media is the rate at which*
24 *errors are found within the media." Page 1, lines 24-27.*

25 Claim 17 is therefore believed to be allowable for at least these additional
reasons. Allowance of claim 17 is respectfully requested.

1 Claim 20 positively recites the following modules: "a technology type
2 determination module," "an application determination module," "a storage device
3 memory test module," "an error tracking, recording and analysis module," and "an
4 age and use tracking module." The cited references fail to teach or suggest at least
5 these recitations, as discussed above in more detail. Claim 20 is therefore believed
6 to be allowable. Allowance of claim 20 is respectfully requested.
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Conclusion

Applicant respectfully requests that a timely Notice of Allowance be issued for all of the pending claims in this matter.

Respectfully Submitted,

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